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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,752	06/27/2003	Yong Sung Ham	049128-5110	5560

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EXAMINER
SHERMAN, STEPHEN G

ART UNIT	PAPER NUMBER
2629	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

	Application No.	Applicant(s)
	10/606,752	HAM ET AL.
Office Action Summary	Examiner	Art Unit	
	Stephen G. Sherman	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 February 2007*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-10 and 18-23* is/are allowed.

6)☒ Claim(s) *11-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 November 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set

forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this

application is eligible for continued examination under 37 CFR 1.114, and the fee set

forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action

has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 26

December 2006 has been entered.

Response to Arguments

2.   Applicant's arguments filed the 26 December 2006 with respect to claims 11-17

have been fully considered but they are not persuasive.

On page 9 the applicant begins their arguments with respect to the rejection of

independent claim 11. The applicant argues on page 9, line 30 that Lee does not teach

of "comparing the reduced-bit source data of a current frame with reduced bit source

data of a previous frame to modulate the source data by retrieving a stored preset

modulated data in accordance with a result of the comparison" and further that the

"preset data" as interpreted by the Examiner is not "stored preset data" as recited in

claim 11. The applicant then states that ARA, Morita and Lee, analyzed singly or in

combination do not teach or suggest all of the elements of claim 11. The examiner

respectfully disagrees.

While the examiner agrees that Lee does not teach of "stored preset data," the

examiner disagrees that ARA, Morita and Lee, analyzed singly or in combination do not

teach or suggest all of the elements of claim 11. As explained in the rejection found

below, the examiner has made a new rejection based upon ARA, Morita and Lee that

does teach the claimed limitations.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

4.   Claim 11 recites the limitation "the preset stored modulated data" on line 10 of

the claim, however, previously in the claim there is only a limitation of "a stored preset

modulated data." Therefore, there is insufficient antecedent basis for this limitation in

the claim.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.   The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating obviousness or nonobviousness.

7.   Claims 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over

the applicants' APA (Specification paragraphs [0003]-[0018] and Figures 1-4), in view of

Morita (US 2002/0196221) and further in view of Lee (US 2001/0038372).

Regarding claim 11, APA discloses an apparatus for driving a liquid crystal

display, comprising:

an input line for receiving source data (Figure 4, Data in); and

a modulator for comparing the source data of a current frame with the source

data of a previous frame to modulate the source data by retrieving a stored preset

modulated data in accordance with a result of the comparison (Figure 4, Fn and F_{n-1} and

page 5, paragraph [0010], 2nd sentence explains that the data is retrieved from a lookup

table where it is stored.), and

wherein the modulator replaces all of the bits of the source data with preset

stored modulated data (As explained above, paragraph [0010], 2nd sentence explains

that the data from the lookup table is used to replace the source data, therefore all of

the bits are replaced with the stored value.).

APA fails to teach of a bit converter for reducing the number of bits of the

received source data to generate reduced bit source data.

Morita discloses a bit converter for reducing the number of bits of the received

source data to generate reduced bit source data (Page 2, paragraph [0023]).

Therefore it would have been obvious to "one of ordinary skill" in the art to

combine the teachings of APA and Morita in order to create a liquid crystal display

driving apparatus that would not cause deterioration in picture quality but would also

reduce the memory of the lookup table.

APA and Morita fail to teach of a method for driving a liquid crystal display

wherein a bit number of a reduced-bit source data of a previous frame is the same as

that of a current frame, and a bit number of the preset modulated data is more than that

of the reduced-bit source data of each previous frame and current frame.

Lee discloses a method for driving a liquid crystal display wherein a bit number of

a reduced-bit source data of a previous frame is the same as that of a current frame,

and a bit number of modulated data is more than that of the reduced-bit source data of

each previous frame and current frame (Figure 11 and paragraphs [0096]-[0102]. The

bit numbers of the previous and present frames are both equal to 6-bits, and the

modified 8-bit signal which is outputted is more than the bit number of the reduced-bit

previous and current frames.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the

time the invention was made to use the method taught by Lee with the method taught

by the combination of APA and Morita in order to enhance the response speed of the

liquid crystal by modifying the liquid crystal driving method without modifying the

structure of the TFT-LCD.

Regarding claim 12, APA, Morita and Lee disclose the apparatus of claim 11.

Morita also discloses wherein the selected modulated data is set to be a

minimum value within a data band that includes a plurality of initial modulated data, and

each of the initial modulated data is larger than a current data value of the current

frame, when the current data value of the current frame is larger than a previous data

value of the previous frame (Page 2, paragraph [0031]. The examiner interprets the

lookup table of consisting of initial modulated data and that a value larger than the

current data value (first input data) could be chosen from this table when the current

data is larger than the previous data (second input data) and that in selecting this data,

since overshooting is being performed, that it would be logical for the value in the data

band that would be selected would be the minimum value because all of the values are

larger than that of the current value and the next highest number would be the

minimum.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to combine the teachings of APA, Morita and Lee in order to allow for the optimization of display characteristics.

Regarding claim 13, APA, Morita and Lee disclose the apparatus of claim 11.

Morita also discloses wherein the selected modulated data is set to be a maximum value within a data band that includes a plurality of initial modulated data, and each of the initial modulated data is smaller than a current data value of the current frame, when the current data value of the current frame is smaller than a previous data value of the previous frame (Page 2, paragraph [0031]. The examiner interprets the lookup table of consisting of initial modulated data and that a value smaller than the current data value (first input data) could be chosen from this table when the current data is smaller than the previous data (second input data) and that in selecting this data, since overshooting is being performed, that it would be logical for the value in the data band that would be selected would be the maximum value because all of the values are smaller than that of the current value and the next lowest number would be the maximum.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to combine the teachings of APA, Morita and Lee in order to allow for the optimization of display characteristics.

Regarding claim 14, APA, Morita and Lee disclose the apparatus of claim 11.

Morita also discloses wherein the source data is modulated to the current data value of the current frame, when the current data value of the current frame is the same as a previous data value of the previous frame (Page 1, paragraph [0012] where it states: "That is, the lookup table 103 is set a value, in advance, so that, when a gray-scale value of an input 1 is equal to a gray-scale of an input 2, the gray-scale value is output as an output 2..." The examiner interprets input 1 and 2 to be the current and previous frame data and that when these values are equal the lookup table is bypassed.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to combine the teachings of APA, Morita and Lee in order to allow the display to maintain the current settings when no change has been detected within the system.

Regarding claim 15, APA, Morita and Lee disclose the apparatus of claim 11.

Morita also disclose wherein the modulator includes: a frame memory for delaying the reduced-bit source data for one frame interval (Figure 1, item 3 and page 2, paragraph [0023]); and a lookup table for comparing the reduced-bit source data of the previous frame with the reduced-bit source data of the current frame to select a preset modulated data in accordance with the result of the comparison (Figure 1, item 4 and page 2, paragraph [0024].

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to combine the teachings of APA, Morita and Lee in order

to allow for a driving apparatus that could compare a previous and current frame and make an adjustment accordingly.

***Regarding claim 16*,** APA, Morita and Lee disclose the apparatus for driving according to claim 15.

Morita also discloses wherein the bit converter is connected between the frame memory and an input terminal of the lookup table (Figure 1, items 1, 3 and 4 where items 1 and 2 make up the bit converter in which item 2 is connected to item 3, the frame memory, and item 2 is also connected to an input terminal of item 4, the lookup table. Since the controller, item 2, is in combination with item 1 to make the bit converter, the bit converter is therefore between items 3 an 4, the frame memory and lookup table.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to combine the teachings of APA, Morita and Lee in order to allow for the source data to be reduced before it is stored in memory so that it will take up less memory space.

***Regarding claim 17*,** APA, Morita and Lee disclose the apparatus for driving according to claim 11.

APA, Morita and Lee fail to disclose wherein the source data is an 8-bit data, and the reduced-bit source data is a 7-bit data.

However, it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to make the source data 8 bits and the reduced source data 7 bits in order to save memory space by allowing for a smaller lookup table.

Allowable Subject Matter

8.   Claims 1-10 and 18-23 are allowable.

9.   The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 1, the primary reason for indicating claim 1 allowable is the inclusion into the existing claim language of the limitation of reducing the number of bits includes converting an odd source data value into an even source data value having the same number of bits as the odd source data, and then reducing the number of bits of the converted even source data, which is not found singularly or in combination within the prior art.

Regarding claim 7, the primary reason for indicating claim 7 allowable is the inclusion into the existing claim language of the limitation of n-k bits corresponding to the most significant of the n bits and the inclusion of the limitation of replacing all of the bits within the n bit source data with the n bit modulated data in combination with the

claim previously reciting of setting a first and second n bit modulated data, which is not

found singularly or in combination within the prior art.

Regarding claim 18, the primary reason for indicating claim 18 allowable is the

inclusion in the existing claim language of the limitation of replacing all of the bits within

the n bit source data with the n bit modulated data in combination with the claim

previously reciting of registering a first and second n bit modulated data, which is not

found singularly or in combination within the prior art.

Conclusion

10.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

Shibata et al. (US 2002/0030652) disclose of comparing current image data to a

reduced bit previous image data, and then outputting corrected data based on this

comparison.

Takahashi et al. (EP 0 517 383 A2) disclose of reducing the number of bits of an

image signal and then comparing the reduced bit values to previous reduced bit values

and then modulating the data.

11.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen G. Sherman whose telephone number is (571) 272-2941. The examiner can normally be reached on M-F, 8:00 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SS

13 March 2007

AMR A. AWAD
SUPERVISORY PATENT EXAMINER